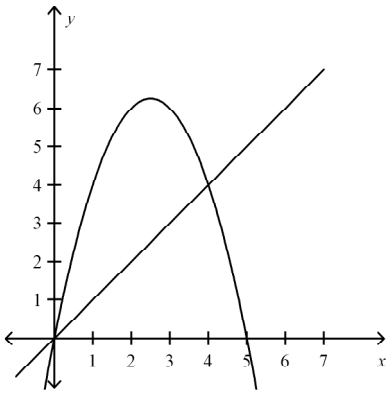
Name: _____ **Class:** _____ **Date:** _____ **ID: A**

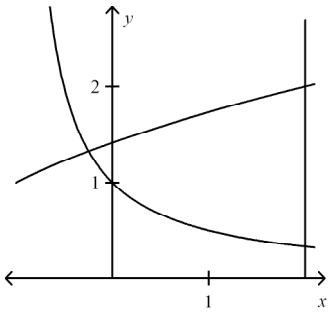
Area - Worksheet 01

Problem

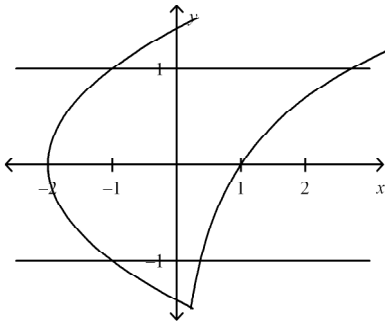
1. Find the area between $y = 5x - x^2$ and $y = x$.
The points of intersection are $(0,0)$ and $(4,4)$.



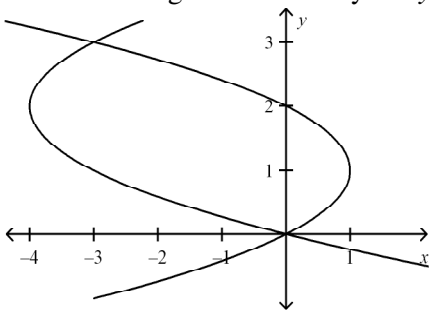
2. Find the area between $y = \sqrt{x+2}$ and $y = \dfrac{1}{x+1}$ and between $x = 0$ and $x = 2$.



3. Find the area of the region bounded by $x = y^2 - 2; x = e^y; y = -1; y = +1$.



4. Find the area of the region bounded by $x = y^2 - 4y; x = 2y - y^2$. The points of intersection are $(0,0)$ and $(-3,3)$.



5. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
   $y = x + 1; y = 9 - x^2; x = -1; x = 2$

6. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
   $y = \sin x; y = e^x; x = 0; x = \dfrac{\pi}{2}.$

7. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
   $y = x; y = x^2$

8. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
   $y = x^2 - 2x; y = x + 4$

9. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
   $y = 1/x; y = 1/x^2; x = 2$

10. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
    $y = 1 + \sqrt{x}; y = (3 + x)/3$

11. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
    $y^2 = x; y = x^2$

12. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
    $y = x^2; y = 4x - x^2$

13. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
    $y = 12 - x^2; y = x^2 - 6$

14. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
    $y = \cos x; y = 2 - \cos x; 0 \le x \le 2\pi$

15. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
    $y = \tan x; y = 2\sin x; -\pi/3 \le x \le \pi/3$

16. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
    $y = x^3 - x; y = 3x$

17. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$y = \sqrt{x}; y = \frac{1}{2}x; x = 9$

18. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$y = 8 - x^2; y = x^2; x = -3; x = 3$

19. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$x = 2y^2; x = 4 + y^2$

20. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$4x + y^2 = 12; y = x$

21. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$x = 1 - y^2; x = y^2 - 1$

22. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$y = \sin(\pi x / 2); y = x$

23. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$y = \cos x; y = \sin(2x); x = 0; x = \pi / 2$

24. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$y = \cos x; y = 1 - \cos x; 0 \le x \le \pi$

25. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$y = x^2; y = 2 / (x^2 + 1)$

26. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$y = |x|; y = x^2 - 2$

27. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$y = 1 / x; y = x; y = \frac{1}{4}x; x > 0$

28. Sketch the region enclosed by the curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle. THEN find the area.
$y = 3x^2; y = 8x^2; 4x + y = 4; x \ge 0$

Area - Worksheet 01
Answer Section

PROBLEM

1. ANS:

$$\int_0^4 5x - x^2 - (x)\,dx = \int_0^4 4x - x^2\,dx = (2x^2 - \frac{x^3}{3})\Big|_0^4 = 32/3$$

PTS: 1 REF: 6.1 #1

2. ANS:

$$\int_0^2 \sqrt{x+2} - \frac{1}{x+1}\,dx$$

PTS: 1 REF: 6.1 #2

3. ANS:

$$\int_{-1}^{+1} e^y - (y^2 - 2)dy = (e^y - \frac{y^3}{3} + 2y)\Big|_{-1}^{+1} = e - \frac{1}{3} + 2 - (\frac{1}{e} + \frac{1}{3} - 2) = \frac{10}{3} + e - \frac{1}{e}$$

PTS: 1 REF: 6.1 #3

4. ANS:

$$\int_0^3 (2y - y^2) - (y^2 - 4y)dy = \int_0^3 6y - 2y^2\,dy = (3y^2 - \frac{2}{3}y^3)\Big|_0^3 = 27 - 18 = 9$$

PTS: 1 REF: 6.1 #4

5. ANS:

$$\int_{-1}^2 (9 - x^2) - (x+1)dx = 10.5$$

PTS: 1 REF: 6.1 #5

6. ANS:

$$\int_0^{\pi/2} e^x - \sin x\,dx = e^{\pi/2} - 1 - (1) = e^{\pi/2} - 2 \approx 22.810477381$$

PTS: 1 REF: 6.1 #6

7. ANS:

$$\int_0^1 x - x^2\,dx = \frac{x^2}{2} - \frac{x^3}{3}\Big|_0^1 = \frac{1}{6}$$

PTS: 1 REF: 6.1 #7

8. ANS:

$$\int_{-1}^{4} x+4-(x^2-2x)dx = \frac{3}{2}x^2+4x-\frac{x^3}{3}\Big|_{-1}^{4} = 24+16-\frac{16}{3}-(\frac{3}{2}-4+\frac{1}{3}) = 39$$

PTS: 1 REF: 6.1 #8

9. ANS:

$$\int_{1}^{2} 1/x-1/x^2\,dx = \ln x+1/x\Big|_{1}^{2} = \ln 2-1/2$$

PTS: 1 REF: 6.1 #9 box

10. ANS:

$$\int_{0}^{9} 1+\sqrt{x}-(3+x)/3\,dx = x+\frac{2}{3}x^{3/2}-x-\frac{x^2}{6}\Big|_{0}^{9} = 18-(81/6) = 9/2$$

PTS: 1 REF: 6.1 #10

11. ANS:

$$\int_{0}^{1} \sqrt{x}-x^2\,dx = \frac{2}{3}x^{3/2}-\frac{x^3}{3}\Big|_{0}^{1} = 1/3$$

PTS: 1 REF: 6.1 #11

12. ANS:
1

PTS: 1 REF: 6.1 #12

13. ANS:
1

PTS: 1 REF: 6.1 #13 box

14. ANS:
1

PTS: 1 REF: 6.1 #14

15. ANS:
1

PTS: 1 REF: 6.1 #15

16. ANS:
1

PTS: 1 REF: 6.1 #16

17. ANS:
1

PTS: 1 REF: 6.1 #17

18. ANS:
1

PTS: 1 REF: 6.1 #18

19. ANS:
1

PTS: 1 REF: 6.1 #19

20. ANS:
1

PTS: 1 REF: 6.1 #20

21. ANS:
1

PTS: 1 REF: 6.1 #21

22. ANS:
1

PTS: 1 REF: 6.1 #22

23. ANS:
1

PTS: 1 REF: 6.1 #23

24. ANS:
1

PTS: 1 REF: 6.1 #24

25. ANS:
1

PTS: 1 REF: 6.1 #25

26. ANS:
1

PTS: 1 REF: 6.1 #26

27. ANS:
1

PTS: 1 REF: 6.1 #27

28. ANS:
1

PTS: 1 REF: 6.1 #28